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EXAMINER

SALERNO, SARAH KATE

ART UNIT	PAPER NUMBER
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2814

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,928	Applicant(s) DELEONIBUS, SIMON	
	Examiner SARAH SALERNO	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendment/arguments filed on 04/18/11 as being acknowledged and entered. By this amendment claims 2 and 9 are canceled, no new claims have been added and claims 1, 2-8 and 10 are pending and no claims are withdrawn.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the base zone must be shown/labeled or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata (US PGPub 2002/0005581) in view of Krivokapic (US Patent 6,452,229).

Claim 1: Kurata teaches a self aligned MIS transistor having in a substrate a source zone and a drain zone on either side of a channel zone, said source and drain zones comprising a buried zone (20) in the substrate and raised zone (21) stacked on the buried zone, as well as a T shaped gate structure comprising:

a vertical bar (13) located above the channel zone, surmounted by a horizontal bar (14) extending on either side of the vertical bar, said horizontal bar having a lower part, a lateral part and an upper part, the gate structure comprising a stacking of one or several conductive layers (13, 14), the gate structure having a base zone round a base of the vertical bar,

wherein the gate structure is coated with a shaping material (15), said material covering the vertical bar of the T, the lower and lateral parts of the horizontal bar of the T, and the base zone said shaping material covering the base zone, said base zone

covered by the shaping material covering at least a part of the buried zone of the source and drain zones and not the raised zone of the source and drain zones (FIG. 4C).

Kurata does not teach the shaping material covering the base zone without extending laterally beyond a vertical projection, on the base zone, of the lateral part of the horizontal bar covered with the shaping material. Krivokapic teaches the shaping material covering the base zone without extending laterally beyond a vertical projection, on the base zone, of the lateral part of the horizontal bar covered with the shaping material to decrease size of device while increasing performance (Fig. 1; Col. 1 lines 35-40). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device taught by Kurata to have the shaping material specification as claimed to have a transistor with a smaller size but better performance as taught by Krivokapic. (Fig. 1; col. 1 lines 35-40)

Claim 3: Kurata teaches first extension zones (17) located between the channel and source and drain zones respectively and having a doping of the same natures as the source and drain zones but weaker [0056-0057].

Claim 8: Kurata teaches a method for manufacturing, on a semiconductor substrate, at least one self aligned MIS transistor having a source zone and a drain zone on either side of a channel zone, said source and drain zones comprising a buried zone (20) in the substrate and a raised zone (21) stacked on the buried zone, as well as a T shaped gate structure of low resistivity comprising a vertical bar (13) located above the channel zone, surmounted by a horizontal bar (14) extending on either side of the vertical bar, said horizontal bar having a lower part, a lateral part and an upper part, the

gate structure comprising a stacking of one or several conductive layers (13, 14), the gate structure having a base zone around the base of the vertical bar of the T, the method comprising a step of forming a solid shape having the T shape of the gate to be formed, and the coating of said shape in a shaping material (15), said shaping material coating the lateral surface of the vertical bar of the T, and the lower and lateral surfaces of the horizontal bar of the T, wherein said shaping material also covers the base zone and at least a part of the buried zone of the source and drain zones and does not cover the raised zone of the source and drain zones(FIG. 4C).

Kurata does not teach the shaping material covering the base zone without extending laterally beyond a vertical projection, on the base zone, of the lateral part of the horizontal bar covered with the shaping material. Krivokapic teaches the shaping material covering the base zone without extending laterally beyond a vertical projection, on the base zone, of the lateral part of the horizontal bar covered with the shaping material to decrease size of device while increasing performance (Fig. 1; Col. 1 lines 35-40). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device taught by Kurata to have the shaping material specification as claimed to have a transistor with a smaller size but better performance as taught by Krivokapic. (Fig. 1; col. 1lines 35-40)

5. Claims 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata (US PGPub 2002/0005581) and Krivokapic (US Patent 6,452,229), as applied to claim 1 above, and further in view of Rodder (US Patent 6,246,091).

Regarding claim 4, as described above, Kurata and Krivokapic substantially read on the invention as claimed, except Kurata and Krivokapic do not teach the second extension zones between the channel and source and drain zones respectively have a doping of nature opposite to that of the source and drain zones. Rodder teaches the second extension zones (105) between the channel and source and drain zones respectively have a doping of nature opposite to that of the source and drain zones to form barrier pocket regions between the source/drain regions and the channel of a transistor reducing short channel effects (Col. 1-2). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device taught by Kurata and Krivokapic to include the second extension zone to form barrier pocket regions between the source/drain regions and the channel of a transistor reducing short channel effects as taught by Rodder (Col. 1-2).

Claim 5: Rodder teaches the second extension zones (105) between the first extension zones (104) and the channel zone have respectively a doping of nature opposite to that of the source and drain zones (Col. 6).

Claim 7: Rodder teaches the stacking of layers constituting the gate structure lodged in the shaping material is intrinsic polysilicon or a metal (Col. 5).

6. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata (US PGPub 2002/0005581) and Krivokapic (US Patent 6,452,229), as applied to claim 1, 8 above, and further in view of Chen (US Patent 6,077,733).

Regarding claims 6 and 10, as described above, Kurata and Krivokapic substantially read on the invention as claimed, except Kurata and Krivokapic do not teach the shaping material is made of silicon nitride (Si_3N_4) or hafnium oxide (HfO_2) or zirconium oxide (ZrO_2) or aluminum oxide (Al_2O_3). Chen teaches the shaping material is of silicon nitride (Si_3N_4) or hafnium oxide (HfO_2) or zirconium oxide (ZrO_2) or aluminum oxide (Al_2O_3) as being known in the art as silicon oxide substitutions (Col. 5-6). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the shaping material taught by Kurata and Krivokapic to be silicon nitride (Si_3N_4) or hafnium oxide (HfO_2) or zirconium oxide (ZrO_2) or aluminum oxide (Al_2O_3) because they are known in the art as taught by Chen. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Response to Arguments

7. Applicant's arguments with respect to claims 1, 3-8 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH SALERNO whose telephone number is (571)270-1266. The examiner can normally be reached on M-R 8:00-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wael M Fahmy/
Supervisory Patent Examiner, Art
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/S. K. S./
Examiner, Art Unit 2814